IN THE CLAIMS

1. (Currently Amended) A wavelength-swept pulse laser, producing a mode-locked short pulsed output whose center wavelength continuously varies with time, comprising:

a resonator having an optical path including therein an optical gain medium capable of amplifying light over a wide wavelength band, a wavelength tunable filter with a minimum loss center wavelength range, and a non-linear medium with light intensity dependent refractive index;

an optical pump means for the creating a population inversion of said in the optical gain medium; and

a filter modulation signal generating means for continuously varying the minimum loss center wavelength range of said wavelength tunable filter with time,

whereby the laser output is a short mode-locked pulse type and its center wavelength varies continuously with time.

2. (Original) The laser of claim 1, wherein said optical gain medium is any one selected from the group consisting of a rare earth ion doped single mode optical fiber, a rare earth ion doped single mode planar waveguide, a titanium doped sapphire crystal and a Nd-YVO₄ crystal.

3. (Original) The laser of claim 1, wherein said optical gain medium is a semiconductor amplifier.

4. (Previously Presented) The laser of claim 3, wherein the optical pump means is an electrical current generator which generates a current whose intensity modulation frequency is equal to the intermode spacing of longitudinal resonator modes or some integral multiple of the spacing, which results the gain constant modulation of said semiconductor amplifier, whereby the wavelength-swept pulse laser generates mode-locked optical pulses and its pulse generation timing is appropriately adjusted.

5. (Original) The laser of claim 1, wherein said wavelength tunable filter is any one selected from the group consisting of an acousto-optic wavelength tunable filter, a Fabry-Perot interferometric wavelength tunable filter and a reflective diffraction grating with varying reflective center wavelength depending upon the rotation of the grating.

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6. (Original) The laser of claim 1, wherein said wavelength tunable filter comprises:

a beam deflection means for controlling the direction of propagating light; and

an optical device capable of producing low optical loss only within determined frequency range when the light transmitted or reflected depending on the controlled beam direction is coupled to the resonator.

7-8. (Cancelled)

9. (Original) The laser of claim 1, wherein said non-linear medium includes a length of single mode optical fiber.

10. (Previously Presented) The laser of claim 1, wherein said non-linear medium is a semiconductor saturable absorber to enhance self-phase modulation effect, whereby said non-linear medium helps the generation of mode-locked optical pulses.

11. (Original) The laser of claim 1, wherein said gain medium is comprised of one optical device that also acts as a non-linear medium.

12. (Original) The laser of claim 11, wherein said gain medium is a rare earth ion doped optical fiber with much non-linear refractive index change or a titanium doped sapphire crystal.

13-14. (Cancelled)

15. (Currently Amended) A method of mode-locked wavelength-swept laser pulse generation, comprising the steps of:

preparing within a resonator a wavelength tunable filter and a non-linear medium with light intensity dependent refractive index;

transmitting optical pulses in said non-linear medium to broaden the spectrum of the optical pulses by inducing self-phase modulation;

tuning said wavelength tunable filter so that the minimum loss wavelength range of the tunable filter can continuously vary with time; and

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amplifying only selected portions of the broadened optical pulses, the wavelength spectrum of the selected portions being placed around the minimum loss wavelength range.

16. (Previously Presented) The method of claim 15, wherein, in the step of tuning the wavelength tunable filter, the wavelength tunable filer is tuned so that a variation speed V is substantially greater than a constant critical speed $V_c(=\ln(r)\Delta^4/b^2)$ for most of wavelength sweeping time, whereby a plurality of resonator modes can simultaneously oscillate, where V is the variation speed of the minimum loss center wavelength of the wavelength tunable filter, and the constant critical speed V_c is defined as $\ln(r)\Delta^4/b^2$, and Δ is the wavelength spacing between resonator modes, and b is the full width at half maximum, and $\ln(r)$ is the natural logarithm of the ratio r of the maximum to the minimum light intensity for each mode.

17. (Original) The method of claim 15, wherein applying electrical signal to said wavelength tunable filter, the frequency and/or voltage of the electrical signal continuously and periodically sweeping over a predetermined range.

18. (Previously Presented) The method of claim 17, wherein superimposing an electrical pulse whose duration time is shorter than the resonator roundtrip time of light over the front portion of each repeating waveform of the electrical signal, thereby tuning pulse generation timing to the electrical pulse as well as helping the generation of optical pulses.

19-22. (Cancelled)